

This interesting result has been accomplished by the use of concentric zones of spheres, the radii of which are in the ratio of 1:226. From Fig. 2, which reproduces a photo-micrograph obtained with the aid of fluorescent uranium glass, it will be seen how very nearly the actual path of the rays conform to the theoretical conditions.

The close approach to mathematical precision with which the rays are brought to a focus renders it very essential that the condenser should be accurately centered and carefully focussed. The optical system is accordingly mounted in a cell which may be slipped into the substage collar of the microscope stand, in the place of the ordinary condenser: it has, however, in addition a special centering device within the cell. To obtain an accurate focus the object slide should have a definite thickness, up to 1 mm. The condenser is focussed with the aid of the rack and pinion of the substage.

#### A NEW MICROSCOPIC ALGA FOR AMERICA.

E. N. Transeau (Trans. Ill. Acad. Sci. 1911) reports the finding of the rare alga, *Gloeotaenium*, in Illinois. As found the alga appears in 2- or 4-celled families, and is a striking microscopic type. Its occurrence is remarkably limited, being found only in an area of about two square meters in the corner of a small artificial pond formed by excavating clay in a tile-yard. Before this it has been found only in Trinidad in the Western hemisphere.

#### SEASONAL SUCCESSION AMONG POND ANIMALS.

W. C. Allee (Trans. Ill. Acad. Sci. 1911) reports a piece of work the like of which should be done with care in many parts of the country. He has made a study of the seasonal succession of animals in old forest ponds at the south end of Lake Michigan. Such a study demands regular collections of materials during the year; a record of all observable physical conditions, as temperature, amount of water, chemical and other character of the water, amount and character of organic food, etc.; an identification of the species and an estimate of the absolute and relative frequency of each; and finally an analysis of the results in such a way as to reach the laws and the causal factors of the successions. Such work lends itself in an excellent way to the possibilities of the isolated

student with the microscope, both with plants and animals, and in the interrelations of plants and animals. Mr. Allee summarizes his results as follows:

1. The phenomena of seasonal succession hold, both in regard to succession of species and to the number of individuals in a species.

2. In numbers the crustaceans are dominant in Spring and Autumn with *Asellus communis* as the dominant species; the Mollusks are dominant in mid-summer, with *Lymnaea reflexa* as the dominant species.

3. The most crowded habitat in the spring is the bottom along the margin of the ponds; in mid-summer, at the surface and in the deepest water; and in the autumn, near the green water plants.

4. The range of animals is more restricted during their breeding season.